

Borehole

10-02-03**Log Event A****Borehole Information**

Farm : <u>A</u>	Tank : <u>A-102</u>	Site Number : <u>299-E25-83</u>
N-Coord : <u>41,201</u>	W-Coord : <u>47,652</u>	TOC Elevation : <u>687.92</u>
Water Level, ft :	Date Drilled : <u>4/30/1962</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>125</u>	

Borehole Notes:

Borehole 10-02-03 was originally drilled in April 1962 and completed to a depth of 75 ft with 6-in.-diameter casing. In 1978, the borehole was deepened to a completed depth of 125 ft. An 8-in. casing was temporarily installed to a depth of 18 ft. Forty-five gal of grout was added to the annulus between the 6-in. and 8-in. casings as the 8-in. casing was removed. An additional 9 gal of grout was added to the bottom of the borehole. There is no mention in the driller's log that the casing was perforated.

"As-built" drawings for the A Tank Farm indicate the original borehole was constructed with 6-in., schedule-30 pipe; however, this type of pipe was not identified in applicable engineering references. The casing thickness for the borehole is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately 6 in. above the ground surface.

Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1996</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>11/01/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>23.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>11/04/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>123.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>92.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Log Run Number :	<u>3</u>	Log Run Date :	<u>11/05/1996</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>93.5</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>22.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

This borehole was logged in three log runs. The total logging depth achieved by the SGLS was 123.5 ft.

Analysis Information

Analyst : S.D. Barry

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 03/02/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing (based on a 6-in., schedule-40 pipe) were applied to the entire logged interval during the analysis process.

Shape factor analysis was applied to the SGLS data. It provides insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A time-sequence plot of the historical gross gamma log data from 1980 to 1994 is presented with the log plots.

Results/Interpretations:

The only man-made radionuclide detected in this borehole was Cs-137. Cs-137 contamination was detected continuously from the ground surface to 17.5 ft, intermittently just above the MDL from 49.5 to 66 ft, and nearly continuously from 77 ft to the bottom of the logged interval (123.5 ft).



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The K-40 log plot shows an interval of decreased concentrations from 10 to 17 ft. At 107 ft, the K-40 concentration values increase from about 13 to 16 pCi/g. The Th-232 concentrations also increase at a depth of about 107 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factor analysis for the interval from the ground surface to about 18 ft is not valid because of the presence of grout on the outside of the borehole casing. The Cs-137 concentrations were measured above the 1-cps threshold from about 77 to 80.5 ft and at 86.5 ft. The CsSF1 values indicate the Cs-137 contamination is uniformly distributed in the sediments surrounding the borehole in these intervals.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks A-102 and A-103.